REMARKS

The Office Action of June 4, 2003 indicated that the amendment filed on 8/8/02 (it is assumed that this refers to the amendment filed on March 18, 2003) was asserted to be non-responsive on the grounds that the claims were amended in a manner whereby only claims drawn to a non-elected species are presented. The Office Action noted that the remaining claims were not readable on the elected species because the independent claims 1, 13 and 20 have been amended to include the limitation "a polarization rotation element in the beam path from the collimating element to the diffraction grating." and that the elected species as shown in Fig. 7 does not illustrate these limitations. Applicant was given a time period of one month from the Office Action to supply the omission or correction, and the Office Action indicated that extensions of this time period under 37 C.F.R. § 1.136(a) are available.

The Office Action of June 4, 2003 was discussed in a telephone interview by applicants undersigned attorney with Examiners Landau and Lee on June 24, 2003. Applicants' attorney requested that the original restriction requirement be reconsidered and withdrawn and reissued inasmuch as the restriction requirement had identified only Figs. 7, 8 and 9 as constituting a species of the invention, and had not identified Figs. 2, 4 or 5 as other species of the invention, and applicants had not been given an opportunity to elect claims readable on Fig. 2 or Figs. 4 or 5. The examiners indicated in the interview that they regarded the features of Figs. 2, 4 and 5 to not be patentably distinct from the features of Fig. 8 and 9, but to be patentably distinct from the features of Fig. 7. The original Restriction Requirement had not indicated that Figs. 2, 4 and 5 were not patentably distinct from any of the other figures. Because of the prohibition of double patenting rejections provided for in 35 U.S.C. §

121 for divisional applications, it is requested that the original restriction requirement be supplemented to indicate which claims or features are deemed to be independent and distinct inventions from the elected species of Fig. 7 so that any divisional application directed to such species will be entitled to the protection against double patenting provided for in 35 U.S.C. § 121.

As discussed further below, applicants have amended the claims in a manner to obviate any question as to whether there are claims remaining in the application that read on Fig. 7. Initially, applicants would request reconsideration of the objection to the last amendment, on the grounds of non-responsiveness, on the basis that the claims as amended can be read on Fig. 7. The Office Action of June 4, 2003 indicates that Fig. 7 does not illustrate the limitation of "a polarization rotation element in the beam path from the collimating element to the diffraction grating." The feature of the polarization rotation element, labeled 16 in Figs. 2, 8 and 9, is not specifically shown in Fig. 7, but the polarization element 16 can be combined with the structure of Fig. 7. The system of Fig. 7 is discussed on pages 9 and 10 of the present application, which refers to an example carried out with the specific system illustrated in Fig. 7. As discussed on page 9, lines 30-31 and page 10, lines 1-2, "note that for this particular commercial diode laser [i.e., an SDL-2380 laser], light is polarized along the quickly diverging direction, and adding the half-wave plate 16 to the cavity only allows an increase in feedback, resulting in lower power output with only modest gains and narrowing and tunability." Thus, for the particular example described in the application using the arrangement shown in Fig. 7, the half-wave plate 16 was not used because it was not of particular benefit given the type of commercial laser that was used in this example. However, the description specifically mentions the possibility of adding the half-wave plate and discusses the effect that adding the half-wave plate would have when added

into the arrangement of Fig. 7 with the particular commercial diode laser that was used. As indicated therein, there are some benefits to using the half-wave plate even with that laser, although it is not preferred. For other types of lasers in which light is not polarized along the quickly diverging direction, the half-wave plate 16 may be preferred in the system of Fig. 7. It is noted that while 37 C.F.R. § 1.83(a) requires that the drawing show every feature of the invention specified in the claims, the rules do not specify that all of the features of a claim must be shown in one figure, and there is no requirement in the rules that each claim include all of the features shown in a single figure. Given the description in the specification discussed above, it is submitted that Fig. 7 could be amended to add the half-wave plate 16 without adding any new matter to the application.

The claims presently in the application also include claims that clearly read on Fig. 7 and which were acted on in the earlier Office Action of October 8, 2002, which examined and rejected Claims 1, 7, 10, 11, 13 and 17-19. By the foregoing amendment, Claim 10 has been rewritten into independent form, incorporating the content of original Claim 1 therein as filed. Claim 10 has further been amended to specify that "wherein a portion of the beam incident on the diffraction grating is directed by the diffraction grating to provide a usable output light beam from the laser system, and including output beam shaping optics comprising lenses and a diffuser." The lenses on the output light beam and the diffuser are clearly shown in Fig. 7 and are discussed on page 10 of the application, at lines 14-18. Such features and the purpose served by such features is neither shown nor suggested in the patent to Stevens, 5,386,426, which was cited in the Office Action of October 8, 2002 in the rejection under 35 U.S.C. § 102 of Claim 10.

By the amendment above, Claim 17 has been amended into independent form, incorporating the content of original Claim 13 as filed, with the additional specification that the

multi-mode laser light output includes a wavelength at which a selected gas can be laser polarized, such that the spectral range of the laser light output is centered at the wavelength at which the selected gas can be polarized.

In the Office Action of October 10, 2002, Claim 17 and Claim 18 dependent thereon were rejected under 35 U.S.C. § 103 over the patent to Stevens in view of the patent to Cates, 5,860,295. The Office Action stated that Fig. 1 of Cates discloses passing the output of a high power laser diode array 1 into a cell 4 containing a gas sample to laser polarize the gas, which contains a mixture of Xe and Rb, and that in view of such teaching, it would be obvious to modify the invention of Stevens for the purpose of producing polarized gas for MRI.

As discussed in the application on page 5, commercially available high power diode lasers provide output power spread over a fairly wide spectral range, as illustrated in Fig. 1 of the present application. In contrast to low power diode lasers, which have a single transverse mode, high power diode lasers have multiple transverse modes. For the production of laser polarized noble gas, only a narrow spectral range of output power is usable. With the typical broad output power spectrum illustrated in Fig. 1, the vast majority of the laser light is not usable and is essentially wasted for laser polarization purposes. By narrowing the spread to a relatively narrow range centered on the wavelength at which the selected gas is polarized, significantly higher output power in the desired usable range can be achieved than is available from laser arrays which have much higher total power but spread over a much greater wavelength range. The results of an example with the optical system of Fig. 7 is discussed on page 10 of the present application. As indicated therein, the maximum polarization achieved with the 1.4 W narrow band laser in the example is nearly identical to that of a 15 W array.

Removing the beam-shaping optics results in even higher Xe polarizations because the entire 2.5 W is delivered to the cell. The narrow-band 2.5 W laser then produces polarizations 40% greater than that of the 15 W array. As noted on page 1 of the application, the typical current cost for 15 W diode arrays is relatively high, and the present invention allows a much less expensive single diode laser to be utilized to achieve the same polarization production.

The advantages of narrowing the laser light output of a broad spectrum, high power diode laser to achieve much more efficient polarizations than is available with conventional lasers is not shown or suggested in Stevens or Cates, and yields a significant advantage in the method of laser polarization which is the subject of Claims 17 and 18.

For the foregoing reasons, it is submitted that the examined Claims 10, 17 and 18 patentably distinguish over all of the references of record, and should be in condition for allowance. For the reasons discussed above, applicants request reconsideration of the restriction requirement and clarification of the claims subject to the restriction requirement.

Respectfully submitted,

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